CLAIMS

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95.0% identical to a sequence selected from the group consisting of:

(a) a polynucleotide fragment of SEQ ID NO:1 or a polynucleotide fragment of the cDNA sequence included in ATCC Deposit No: PTA-3161, which is hybridizable to SEQ ID NO1;

(b) a polynucleotide encoding a polypeptide fragment of SEQ ID NO:2 or a polypeptide fragment encoded by the cDNA sequence included in ATCC Deposit No: PTA-3161, which is hybridizable to SEQ ID NO:1;

(c) a polynucleotide encoding a polypeptide domain of SEQ ID NO:2 or a polypeptide domain encoded by the cDNA sequence included in ATCC Deposit No: PTA-3161, which is hybridizable to SEQ ID NO:1;

(d) a polynucleotide encoding a polypeptide epitope of SEQ ID NO:2 or a polypeptide epitope encoded by the cDNA sequence included in ATCC Deposit No: PTA-3161, which is hybridizable to SEQ ID NO:1;

(e) a polynucleotide encoding a polypeptide of SEQ ID NO:2 or the cDNA sequence included in ATCC Deposit No: PTA-3161, which is hybridizable to SEQ ID NO:1, having potassium channel beta subunit activity;

(f) a polynucleotide which is a variant of SEQ ID NO:1;

(g) a polynucleotide which is an allelic variant of SEQ ID NO:1;

(h) an isolated polynucleotide comprising nucleotides 124 to 1095 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 325 of SEQ ID NO:2 minus the start codon;

(i) an isolated polynucleotide comprising nucleotides 121 to 1095 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 1 to 325 of SEQ ID NO:2 including the start codon;

(j) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:1; and

(k) a polynucleotide capable of hybridizing under stringent conditions to any one of the polynucleotides specified in (a)-(j), wherein said polynucleotide does not

hybridize under stringent conditions to a nucleic acid molecule having a nucleotide sequence of only A residues or of only T residues.

2. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding a human potassium channel beta subunit protein.

3. A recombinant vector comprising the isolated nucleic acid molecule of claim 1.

4. A recombinant host cell comprising the vector sequences of claim 3.

5. An isolated polypeptide comprising an amino acid sequence at least 95.0% identical to a sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-3161;

(b) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-3161, having potassium channel beta subunit activity;

(c) a polypeptide domain of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-3161;

(d) a polypeptide epitope of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-3161;

(e) a full length protein of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-3161;

(f) a variant of SEQ ID NO:2;

(g) an allelic variant of SEQ ID NO:2;

(h) a species homologue of SEQ ID NO:2;

(i) a polypeptide comprising amino acids 2 to 325 of SEQ ID NO:2, wherein said amino acids 2 to 325 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;

(j) a polypeptide comprising amino acids 1 to 325 of SEQ ID NO:2; and

(k) a polypeptide encoded by the cDNA contained in ATCC Deposit No. PTA-3161.

6. The isolated polypeptide of claim 5, wherein the full length protein comprises sequential amino acid deletions from either the C-terminus or the N-terminus.

7. An isolated antibody that binds specifically to the isolated polypeptide of claim 5.

8. A recombinant host cell that expresses the isolated polypeptide of claim 5.

9. A method of making an isolated polypeptide comprising:

(a) culturing the recombinant host cell of claim 8 under conditions such that said polypeptide is expressed; and

(b) recovering said polypeptide.

10. The polypeptide produced by claim 9.

11. A method for preventing, treating, or ameliorating a medical condition, comprising the step of administering to a mammalian subject a therapeutically effective amount of the polypeptide of claim 5 or the polynucleotide of claim 1.

12. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or absence of a mutation in the polynucleotide of claim 1; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or absence of said mutation.

13. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or amount of expression of the polypeptide of claim 5 in a biological sample; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or amount of expression of the polypeptide.

14. An isolated nucleic acid molecule consisting of a polynucleotide having a nucleotide sequence selected from the group consisting of:

(a) a polynucleotide encoding a polypeptide of SEQ ID NO:2;

(b) an isolated polynucleotide consisting of nucleotides 124 to 1095 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 325 of SEQ ID NO:2 minus the start codon;

(c) an isolated polynucleotide consisting of nucleotides 121 to 1095 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 325 of SEQ ID NO:2 including the start codon;

(d) a polynucleotide encoding the K+betaM6 polypeptide encoded by the cDNA clone contained in ATCC Deposit No. PTA-3161; and

(e) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:41.

15. The isolated nucleic acid molecule of claim 14, wherein the polynucleotide comprises a nucleotide sequence encoding a human potassium channel beta subunit protein.

16. A recombinant vector comprising the isolated nucleic acid molecule of claim 15.

17. A recombinant host cell comprising the recombinant vector of claim 16.

18. An isolated polypeptide consisting of an amino acid sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:2 having potassium channel beta subunit activity;

(b) a polypeptide domain of SEQ ID NO:2 having potassium channel beta subunit activity;

(c) a full length protein of SEQ ID NO:2;

(d) a polypeptide corresponding to amino acids 2 to 325 of SEQ ID NO:2, wherein said amino acids 2 to 325 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;

(e) a polypeptide corresponding to amino acids 1 to 325 of SEQ ID NO:2; and

(f) a polypeptide encoded by the cDNA contained in ATCC Deposit No. PTA-3161.

19. The method for preventing, treating, or ameliorating a medical condition of claim 11, wherein the medical condition is selected from the group consisting of a gastrointestinal disorder, a reproductive disorder, an immune disorder, a neural disorder, a cardiovascular disorder, a pulmonary disorder, a disorder related to hyper potassium channel activity, an immune disorder related to aberrant NF-kB

activity, pineal gland associated disorders, migraine headaches, disorders associated with aberrant melatonin synthesis and/or release, delayed sleep phase syndrome, aberrations in circadian cycle, mammary cancer tumorigenesis, disorders associated with low DNA repair capacities or low free-radical buffering capacity, sleep disorders, age related disorders associated with decreased melatonin secretion, and cancer.